

## CLAIMS

1. An optical pickup device for irradiating a light from a light source onto an optical recording medium through an objective lens moved in a focal direction by an actuator,  
5 and for causing a signal detecting unit to receive a return light from the irradiated light, the optical pickup device comprising:

an access limit introducing unit that obtains shape information on the optical recording medium in a diameter  
10 direction before recording and/or reproducing is performed on the optical recording medium, and that sets limits to access distances of the objective lens to the optical recording medium according to a plurality of positions of the optical recording medium in the diameter direction,  
15 respectively based on the obtained information on the shape; and

a collision avoiding unit that restricts movement of the objective lens in the focal direction by the actuator based on the plurality of set limits to the access  
20 distances.

2. The optical pickup device according to claim 1, wherein the collision avoiding unit restricts the movement of the objective lens in the focal direction by the  
25 actuator by restricting a drive current applied to the actuator.

3. The optical pickup device according to claim 1,  
wherein

the collision avoiding unit includes a movable stopper  
5 unit that is movable in the focal direction, and that  
restricts the movement of the objective lens in the focal  
direction, and

the collision avoiding unit restricts the movement of  
the objective lens in the focal direction by the actuator  
10 by controlling a position of the movable stopper.

4. The optical pickup device according to any one of  
claims 1 to 3, further comprising:

a signal detecting unit that detects a focus error  
15 signal used when the objective lens is moved in the focal  
direction; and

a drive-current detecting unit that detects a drive  
current applied to the actuator, wherein

the access limit introducing unit obtains the shape  
20 information on the optical recording medium in the diameter  
direction based on the focus error signal and the drive  
current.

5. The optical pickup device according to claim 4,  
25 wherein the access limit introducing unit sets the limits  
to the access distances of the objective lens to the

optical recording medium based on the drive current  
necessary to move the objective lens to a position at which  
the focus error signal is equal to zero, and on the drive  
current necessary to move the objective lens from the  
5 position at which the focus error signal is equal to zero  
to the optical recording medium.

6. The optical pickup device according to any one of  
claims 1 to 3, further comprising:

10 a signal detecting unit that detects a focus error  
signal used when the objective lens is moved in the focal  
direction; and

a distance measuring unit that measures a distance of  
the objective lens to the actuator in the focal direction,  
15 wherein

the access limit introducing unit obtains the shape  
information on the optical recording medium in the diameter  
direction based on the focus error signal and the distance  
of the objective lens in the focal direction.

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7. The optical pickup device according to claim 6,  
wherein the access limit introducing unit sets the limits  
to the access distances of the objective lens to the  
optical recording medium based on the distance of the  
25 objective lens to the actuator in the focal direction at a  
position at which the focus error signal is equal to zero,

and on the distance of the objective lens to the optical recording medium at the position at which the focus error signal is equal to zero.

5    8.    A collision preventing method of preventing collision between an objective lens moved by an actuator in a focal direction and an optical recording medium onto which a light is irradiated from a light source, the collision preventing method comprising:

10        a first step of obtaining shape information on the optical recording medium in a diameter direction before recording and/or reproducing is performed on the optical recording medium;

      a second step of setting limits to access distances of  
15    the objective lens to the optical recording medium according to a plurality of positions of the optical recording medium in the diameter direction, respectively based on the obtained shape information; and

      a third step of restricting movement of the objective  
20    lens in the focal direction by the actuator based on the plurality of set limits to the access distances.